in a conscious, deliberate effort to maximize group creativity. They were more analogous to random psychosocial mutations and were subjected to brutal natural selection in ethnic and later religious wars. Religions often represent a type of psychosocial specialization which increase entropy by closing the collective mind of the group to contradictory models. Therefore, religions which evolved in more progressive cultures represent radical psychosocial mutations within the group that are imposed by revolutions. Religion is a psychosocial bond which is a more tenuous extension of the sexual and group hunting bonds of primitive hominids. A rational, objective system of ethics can serve the same purpose.

Objective Ethics

Objective ethics are a way of forming an ethical code which can continue to evolve without closing the collective human mind. By seeing ethical behavior in its evolutionary perspective we can determine objective criteria of optimality by which to judge whether an action is good or evil. Survival may appear to be such a criterion. But survival is more a constraint, or better still, a consequence, of ethical behavior rather than the prime criterion of optimality.

Optimality refers to the extremal (a maximum or a minimum) of a process in a desired direction. The direction of evolution is clearly toward ever greater intelligence through increasing complexity. Creativity is the most generalized form of intelligence. The complexity of a system is directly proportional to the number of its individual components and the number of the interconnections between the components. As has been shown, specialized complexity is increasingly unstable and eventually becomes entropic. Only generalized complexity and intelligence continue to evolve. Objective ethics are therefore generalized rules of conduct which when followed maximize over time the collective creativity of a group.

Beings are ethical if and only if they can predict and control their own ability to predict and control. Beings behave ethically if and only if they subscribe to an objectively ethical code. An unethical being is any being who systematically diminishes the creativity of any person or group.

An ethical code, if it is to be intrinsically self-consistent, must limit membership in the group to ethical persons and expel unethical persons, since unethical persons are by definition destructive to the group's intelligence. Intelligence itself can be used to (1) increase intelligence through creativity or (2) decrease intelligence through destructiveness. Unethical intelligence is intelligence used to diminish intelligence; it is a type of psychosocial parasitism exemplified by human beings who prey on other more creative human beings. Ethical intelligence is synonymous with creativity. It is intelligence used to increase intelligence; for example, human beings who learn, teach, and create but do not destroy. Creativity is the highest

form of intelligence. From this follows the evolutionary ethic which must form the criterion of optimality for any objectively valid system of ethics:

Each person must do his or her best to maximize creativity.

It seems that all known ethical systems incorporate the evolutionary ethic intrinsically by having taboos against certain types of specific behavior which would violate the ethic, e.g., murder and lying, and, much less often, exhortations to perform certain specific acts which would agree with the evolutionary ethic, e.g., to be industrious and to help those less fortunate than themselves. Therefore, all ethical codes claim implicitly or explicitly to increase intelligence and creativity. The problem arises when they incorporate false religious models which are subjectively ethical but objectively unethical.

Objectively we can determine the validity of any ethical code by its fitness. Since ethical codes, like all other aspects of humanity, are subjected to natural selection, those codes which survive the longest and are incorporated into the cultures with the greatest numbers of creative persons must be those which are in closest correspondence to the evolutionary ethic. In order to see that this is the case, we must first derive specific ethical principles from the more general evolutionary ethic.

Ethical Principles

As we have seen, ethics are relative insofar as specific acts are concerned, since the same specific behavior, such as shooting an arrow, may be ethical in one context but unethical in another, e.g., (1) killing wild game to be shared by the group or (2) murdering an ethical member of the group, respectively. Ethical principles are a code of conduct which is sufficiently general to apply to all possible situations, but which is still more specific than the evolutionary ethic. Any valid ethical principle must be shown to always increase at least one component of the collective ethical intelligence of the group and never decrease any component of collective ethical intelligence. Recall that creativity is synonymous with ethical intelligence. The collective creativity of the group is a function of the individual intelligence of its members, their collective ethics, and the set of all their technology. Their ethical code may be considered to be a function of their individual intelligence and collective knowledge. There is a constant interaction between the ethical code and all the other components of intelligence.

The ethical code is a unique machine which amplifies the Will (W) in the evolutionary direction. This is the only known machine which amplifies this component of intelligence. The human Will (W) is itself already genetically programmed in the ethical direction by the neocortex. Therefore, when we speak of amplifying innate human ethics, we merely mean the amplification of the Will (W) in the evolutionary direction.

We have now given examples of machines which amplify all the components of intelligence except Imagination (G). The amplification of Imagination (G) is extensively discussed later on. For now we note that Imagination (G) is diminished by the closure of mind that results from any type of specialization. Imagination (G) will be amplified by a machine which makes the total knowledge of the group available to each individual member in an integrated, coherent manner. The theory of creative transformation and its applications being developed in this book are machines to amplify Imagination (G).

The Will (W) is the component of intelligence which gives evolutionary direction to a species. The Will (W) is a vector whose direction determines what the organism will predict and control and whose magnitude determines the resolve to maintain this direction and act purposefully. Evolutionary ethics amplifies the Will (W) in the direction of the Moral Sense, namely, that of maximizing generalized, ethical intelligence. The ethical code is a psychosocial group analog of personal Will (W) used as an amplifier of the Moral Sense. The Moral Sense is the genetically programmed need to increase ethical intelligence. The ethical code, when it is in correspondence with the evolutionary ethic, gives the collective Will (W) of the group the direction of maximizing general, collective ethical intelligence. Creativity and ethical intelligence are equivalents in the sense that C = IE, where C = creativity, I = intelligence, and E = ethics. From this observation, we can deduce *eight general ethical principles* which form an objective, evolutionary ethical code. Such a code clarifies what we mean by "good" and "evil." They are as follows:

1. Only actions or persons which increase creativity are ethical. [This is the meaning of "good."]

2. Any action or person which decreases creativity is unethical. [This is the meaning of "evil."]

3. Unethical means can never achieve ethical ends.

4. Means which are not ends are never ethical.

5. It is unethical to tolerate destructiveness.

6. It is unethical to be certain.

7. It is ethical to doubt.

8. Inaction is unethical.

These principles follow logically and scientifically from the evolutionary ethic. We will state these ethical principles as theorems and present heuristic arguments for and examples of each principle.

First principle

Only actions or persons which increase creativity are ethical.

This follows directly from the evolutionary ethic and the definition of "ethical." In general, a person is behaving ethically during a given period of time if and only if the net effect of his/her actions during this period is to increase creativity. If a person increases no creativity other than his/her own, and he/she does not decrease creativity for any other person, he/she has been ethical but not necessarily optimal, unless the other ethical principles which follow have also been satisfied.

Second principle

Any action or person which decreases creativity is unethical.

From the first principle it follows that since only actions and persons which increase creativity are ethical, then any action which decreases creativity is either unethical or trivial.

Definition: An action or person is trivial if and only if it does not affect creativity positively or negatively.

Every action and person is either ethical, unethical, or trivial. Therefore, the second principle follows from the first and from the definitions of ethical, unethical, and trivial.

If a person decreases creativity for any person including himself/herself, then he/she behaved unethically. A person may behave both ethically and unethically during a given period. A person is ethical if the net effect of all his/her actions is ethical, i.e., his/her ethical acts outweigh his/her unethical acts. A person is unethical if the net effect of all his/her acts is unethical, i.e., his/her unethical acts outweigh his/her ethical acts.

Definition: A person is moral at time t if and only if all his/her future acts after time t are ethical.

Definition: A person is immoral at time t if and only if all his/her future acts after time t are unethical.

Observation: The set of all trivial acts and persons is a set of measure zero, i.e., almost all acts are either ethical or unethical. (See Glossary and pp. 125–26 for how these concepts relate to Equation 3.1.)

Third principle

Unethical means can never achieve ethical ends.

From the second principle we have that an unethical means is any means which decreases creativity. From the evolutionary ethic and the first

principle we have that the only ethical end is to increase creativity. Since one cannot increase creativity by decreasing it, unethical means can never achieve ethical ends. This means that it is unethical to attempt to increase the creativity of a group, no matter how large, by decreasing the creativity of even one person.

This principle probably became adopted into ethical codes through natural selection when early groups violated it by cannibalizing their fellows in times of famine. Those groups in which nutritive cannibalism of ethical members was practiced had less fitness than those groups which did not have this practice, but did their best to care for *all* members of the group. The fossil evidence indicates that cannibalism was widely practiced among primitive man; however, almost no viable society in recorded history had this practice. Those that did, such as the Aztecs, almost always limited this practice to prisoners of war, and were themselves eventually subjected to total conquest by noncannibals.

A variation of cannibalism was the much more widespread practice of religious human sacrifice among many ancient civilizations throughout the world. These ranged from the Philistines and ancient Hebrews of 3,000 years ago to the Vikings and Mayans of 1,000 years ago. This was also a violation of the third principle, which indicated a high degree of entropy in these cultures, which in turn made their replacement by cultures not practicing human sacrifice inevitable.

In modern times we have seen the violation of the third principle by societies which practice slavery. Slavery is analogous to slow-motion cannibalism in that a human being is consumed by forced work. Inevitably these societies will destroy their imagination through slavery, which is a type of psychosocial specialization, and fall prey to societies which use machines and not slaves to amplify individual intelligence. We saw this in the eventual domination of the slave-based Islamic civilization by the technology-based civilization of Western Europe, even though Islam had at one time been more technologically advanced and far wealthier than Christian Europe. The same thing happened between the slave-based southern United States and the technology-based northern United States in 1865. The United States is still suffering today from having tolerated slavery for "four score and seven years."

The economic and social problems of communist countries, which do not allow their citizens to emigrate on demand, thereby making them de facto slaves, can be traced to their violation of the third ethical principle. Another example of unethical means failing to produce ethical ends was in the Nazi use of concentration-camp victims in medical experimentations. Although thousands of experiments were done, no useful knowledge came from these experiments.

Observation: All ethical persons belong to the same group.

Corollary: A corollary of the third principle is that, other things

being equal, the more tyrannical societies will by-and-large be dominated by the more libertarian societies. For this reason, in every major war of the last 200 years, including the cold war, the freer side has won. Right makes might. It is right, i.e., ethical, to maximize the creativity of every person (E.P. 1). It is always wrong, i.e., unethical, to diminish the creativity of any person (E.P. 2) for the benefit of any other person or group (E.P. 3). Any unethical act must always lead to the decrease in the net creativity of the person committing the act and/or the group sanctioning or tolerating the unethical act. That is why the communist countries cannot catch up in creativity or wealth to the western democracies, although their monolithic control and size makes them appear militarily formidable. They must become more libertarian, or die. The ends do not justify the means.

Fourth principle

Means which are not ends are never ethical.

Since the only ethical end is to increase creativity, means which are not ends are any means which do not directly increase creativity. Such means can only be unethical or trivial. If an act is unethical, we know from the third principle that it is inconsistent with any ethical end. If an act is trivial, it follows from analogy, and from the fact that trivial acts are a set of measure zero, that it can at best achieve only trivial ends. Therefore, means which are not ends are never ethical.

In other words, a means is ethical if and only if it is an ethical end in itself, i.e., if and only if it increases creativity directly. Persons or societies which use any means which do not directly increase creativity will as a consequence increase their entropy. This was previously shown to be the case for unethical means. In the case of trivial or apparently trivial means, we see this in the practice of religious rituals which do not seem to directly harm anyone but have no logical or scientific connection to the problem at hand. The building of huge tombs devoid of esthetic merit for conducting its occupants to a nonexistent afterlife represented an enormous but trivial expenditure of energy by the ancient Egyptians that could have been ethically used to build dams, aqueducts, schools, and military defenses. This trivial preoccupation with life after death, besides wasting the energy of creative people, in time led to a death-oriented civilization no longer creative and subject to conquest by succeeding waves of Hyksos, Hittites, Libyans, Persians, Greeks, Romans, and Arabs until almost no trace of the original civilization remained—not its language, writing, religion, or customs. Only archaeological ruins remained.

It should be emphasized that religious structures are not entropic in and of themselves, but only when they represent a waste of energy and provide no social benefit. The cathedrals of Europe served as means of

organizing and unifying primitive groups of Europeans who had sunk into barbarism. They were inspirational public meeting places. More importantly, the cathedrals were artistic and technological masterpieces which, like all art forms, expressed the unconscious synthesis of the collective ethical intelligence of Europe. The religious shrines and trivial customs, e.g., repositories for miraculous relics and dietary laws respectively, which were to be elaborated within the Catholic Church, were basically entropic and were not to be kept in the more progressive forms of Christianity typified by the Protestant sects of northern Europe.

All forms of compulsive, repetitive behavior which have no current relationship to creativity increase the entropy of the individual and the group. This ritualistic behavior is not confined to religions but may include the ritualistic behavior of spectator sports, as well as many of the "social graces."

As a final example, consider the willingness of devout Moslems and Hindus to starve rather than eat proscribed pork or beef. In the case of some Moslems and Hindus, their dietary laws, which originally may have had a public health or other social function, have become entropic ends in themselves, and the original ethical ends have been lost to trivial means. It is in the nature of humanity that the means eventually become the ends. Only means which are ethical ends in and of themselves will have survival value and serve evolutionary purposes. Only means which directly enhance our ability to learn, teach, and create are ethical.

Fifth principle

It is unethical to tolerate destructiveness.

Since (1) the evolutionary ethic directs us to maximize creativity, (2) destruction is the decrease in anyone's creativity, (3) creativity cannot be increased, much less maximized, by allowing it to be diminished (E.P.'s 2, 3, & 4), and (4) we are an interconnected, interdependent species in the process of creating a collective ethical intelligence at the super-metazoan level, then the decrease of creativity for any one person decreases it for the entire species. Furthermore, the second law of thermodynamics states that entropy must increase for any closed system. The decrease of creativity for even a single ethical individual represents a closing of the collective mind of humanity. Unless it is forcefully overcome, entropy can spread without limit and bring the human species to extinction, just as it has caused the extinction of thousands of specialized species in the past. Therefore, it is unethical to allow creativity to be decreased because to do so is to violate the evolutionary ethic.

Historically, any society which tolerated destruction in any way was sowing the seeds of its own extinction by increasing its own entropy. For this reason, almost all progressive cultures have had strong admonitions

and sanctions against murder, stealing, lying, and other destructive acts because destructive acts decrease the creativity of the individual and, consequently, of the society. However, virtually all societies have been prone to a more subtle form of self-destructive behavior, one which stems from seeking to prevent the dissemination of information concerning their own weakness.

This is usually done for the alleged purpose of denying this information to its enemies, but in the process important information is also denied to its ethical members, and misleading, optimistic information about weaknesses of the society is put in its place. Since information is a prime component of intelligence, misleading information will diminish creativity for the individual and the society so that corrective action will not be taken and entropy will increase. Therefore, closed, secretive societies are likely to become extinct, while open, free societies are likely to grow and multiply. Thomas Jefferson's swearing of "eternal hostility against every form of tyranny over the mind of man" is grounded on sound evolutionary ethical principles. The success of the United States, Western Europe, and other relatively open democratic societies over more closed, secretive, and despotic societies during the past 200 years is further empirical evolutionary evidence that it is unethical to allow creativity to be diminished for the individual or the society.

Sixth principle

It is unethical to be certain.

Once a person or society is certain about any cause-and-effect relationship, that person or society has resolved that he, she, or it has nothing more to learn about that subject. Since the universe is apparently an infinite, interconnected whole, as was indicated in Chapter 1, and our knowledge is always finite, it is objectively false to presume that we have complete knowledge on any subject. Therefore, a state of certainty precludes further knowledge and the maximum expansion of creativity. Certainty represents a closing of the mind, which is a prelude to irreversible entropy. Furthermore, persons or societies which are certain that they have found truth will tend to be intolerant of persons who question that truth and search for more knowledge in that particular subject area. This will cause a decrease in creativity in violation of the second principle. Therefore, it is unethical to be certain.

Corollary: Because it is unethical to be certain, any person or society which persecutes an individual or a group because it believes that they are unethical and are, as a consequence, diminishing creativity, will risk destroying its own creativity. Therefore, a more ethical alternative for a group is to expel its alleged unethical members by exiling them instead of

killing or imprisoning them, which might destroy creativity. By exiling alleged unethical members, a society only risks losing a source of knowledge for itself and slows down the evolutionary rate if its judgment is mistaken; it does not destroy this knowledge for the entire species. All judgments must be tentative. We should try to avoid any act which might result in irreversible damage if our judgment is in error, although it is better to act decisively than not to act at all. In general we judge acts, not persons.

Seventh principle

It is ethical to doubt.

Since it is unethical to be certain, it is either trivial or ethical to doubt. Since, by the argument given in E.P. 6, (1) it is not possible to learn unless one has doubts because our minds become closed to new knowledge in the absence of doubt; and since (2) learning is always ethical and never trivial, doubt is ethical and not trivial. Therefore, it is ethical to doubt.

Historically we see that persons and societies which have questions about nature are those that learn about nature. Those that have no doubts about any cause-and-effect relationships can not learn about that subject.

We see that the effects of suppressing Galileo's doubts about the sufficiency of the Ptolemaic model of the universe by the Catholic bureaucracy, which officially had no doubts, caused a drastic decline in scientific and technological creativity in the purely Catholic countries of southern Europe relative to the countries of northern Europe which were not subject to Catholic authority. Note that up to this time the southern European countries had been more creative in science and technology than the countries of northern Europe. If they had serious doubts about their ideology, the Inquisition would not have burned hundreds of thousands of heretics, the Communists would not have killed tens of millions of dissidents, and the Nazis would not have slaughtered millions of Jews, Gypsies, Slavs, and other alleged "inferior races." If they had doubts, Catholics and Protestants would not still be murdering each other in Ireland, and Moslems and Hindus would live in peace in Asia. Throughout history the absence of doubt has been a prelude to irreversible entropy and destruction.

The scientific revolution of the last 300 years was based on abandoning the authoritative certainty of religion and substituting for it the principle of doubt. Modern science, which has done more to increase the intelligence, not necessarily the ethics, of humanity in the last 300 years than religion did in over 100,000 years, is based on the principle that all models of cause-and-effect relationships are to be assumed probably false until proven true by repeated, controlled, independent experiments. Even then a scientific model is considered not as absolutely true and beyond all doubt, but only as tentatively and relatively true until a better model comes along

which better enables us to predict and control. The conservatism and skepticism of science are based on the fact that it is much easier to formulate convincing, apparently logical models which are false than to formulate models which are true. It is ethical to doubt.

Eighth principle

Inaction is unethical.

Evolution is not possible without action. We know from the second law of thermodynamics that entropy must increase in a closed system. What keeps a system open is purposeful ethical action. At first this action is physicochemically caused, then it is biologically caused, and finally it is ethically caused. Before the onset of ethical behavior, natural selection operates in a largely automatic but not totally deterministic way, as we shall show in Chapter 5. No known subhuman species can make the deliberate choice to evolve or not to evolve, although all species can make choices which affect their evolution. Only ethical species can make this ultimate choice. Only ethical species can deliberately commit suicide. But because of the second law, merely doing nothing is enough to enable entropy to destroy the human species. Creativity either is forcefully expanded or it is destroyed by inaction and entropy. Since the evolutionary ethic is that we must each do our best as individuals and as a species to maximize creativity, we will clearly fail in our ethical purpose if we take no action. Therefore, inaction is unethical.

Historical Perspective

So long as humanity was subjected to the brutal and unavoidable natural selection of prehistory, individuals and groups could not avoid action without quickly becoming extinct through the actions of predatory animals, other competitive human groups or the forces of nature in general. Therefore, humans who were not disposed to ethical action quickly died and left few or no progeny. However, the advent of civilization made it possible for growing numbers of parasitical human beings to live from the ethical action of others. At first these human parasites were limited to small, hereditary aristocracies and nobilities which exploited large numbers of peasants, artisans, and slaves, but produced nothing of value themselves.

When one group of persons obtained absolute military control over others, they could enslave them *de facto* or *de jure*. Before the advent of rudimentary civilization these captives were either cannibalized or merely killed, since they were considered of no value to the conquerors except as food and they would have been an economic liability to a hunting band, except possibly for some of the women. With the advent of agriculture and the formation of large groups with many specialized tasks, it became